

Mighty Works to Be Built at Terminals of Panama Canal

M Culebra, Canal Zone, Panama. INVESTIGATIONS this week have been devoted to the terminals of our great canal at Panama. What kind of cities are we to have at the Atlantic and Pacific ends of Uncle Sam's famous waterway? How shall we take care of the shipping, and what will be the accommodations for passengers going from one part of the isthmus to the other? These and other questions of terminal facilities will soon bulk large in the minds of the public. The digging is fast approaching completion, and the endless river of earth which is flowing from Culebra down to Balboa will finally sink and then stop. I have already gone in from the Pacific end of the canal almost to the Miraflores locks. The dredges are still at work there, but within a few months the channel could be made ready for ships.

The dredging on the Atlantic side is rapidly approaching completion. The dam which crossed the canal at Mindi has been cut through, and the salt waters of the Caribbean Sea are now against the locks and within a stone's throw of the Gatun dam.

The work of building up the foundations for the terminals of the future is already under way, and docks and breakwaters are rising on both sides of the isthmus. So far there is much yet to be decided, but the plans of the engineers have been carefully made, and as soon as Congress gives its orders this part of the canal construction will rapidly move.

A Talk with Rear Admiral Rousseau. The canal commissioner who has special charge of the terminals is Mr. H. H. Rousseau, one of the most expert engineers of the United States Navy. He is still a young man, but he has had long experience in work of this kind, and he was chief of our great naval bureau of yards and docks when he was appointed one of the engineer commissioners of the canal.

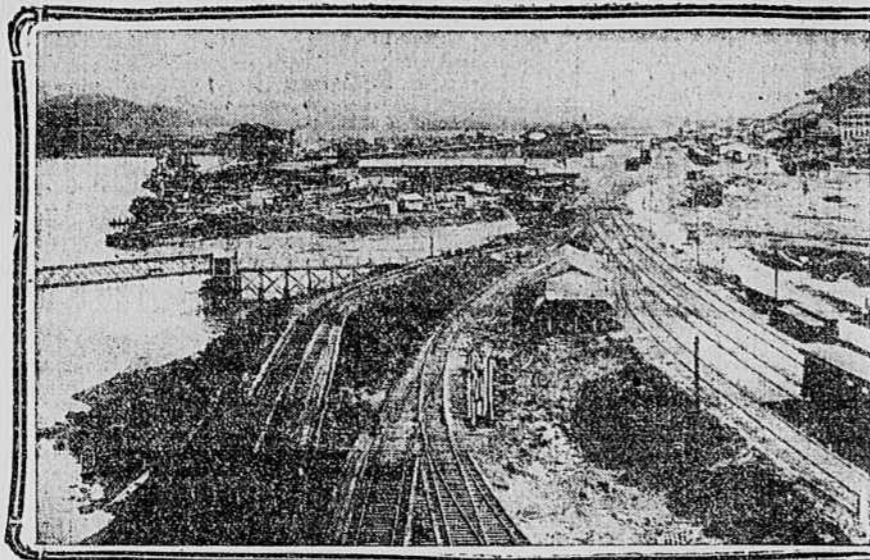
He was a civil engineer by profession at the time he passed a competitive examination for similar work in the navy, with the rank of lieutenant, and he did so well there that now, at the age of forty-two, he has become a rear admiral, and under Commissioner Goethals as chief has some of the most important branches of the canal work under him.

It was in the administration building here at Culebra that I looked over the maps of the proposed terminals and talked with Mr. Rousseau about them. Said he:

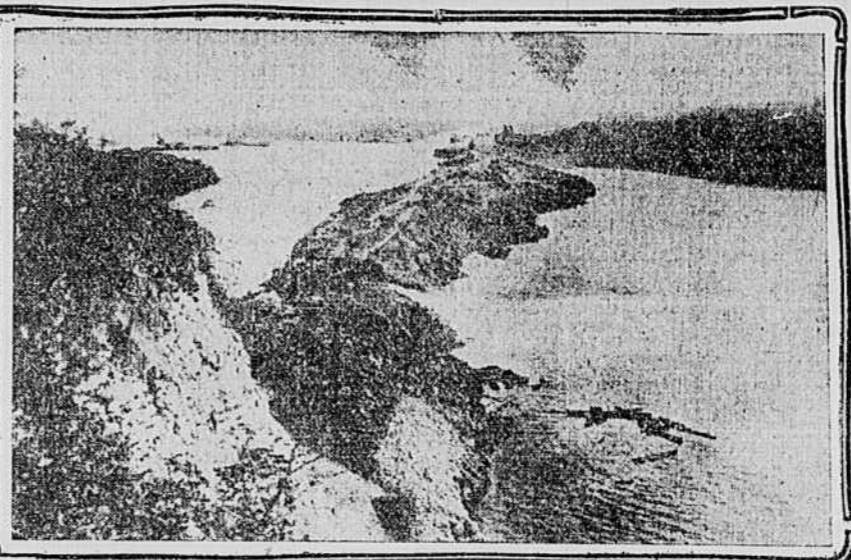
"The arrangements for the terminals of the canal are by no means complete. We have made our plans, but so far many of them have not been passed upon by Congress, and much will depend upon the policy of the government as to the treatment of canal traffic. Other matters have been definitely settled, and we are already working them out. You have seen the great breakwaters which we are building at both ends of the canal. On the Atlantic side they will pass in by Toro Point, where the lighthouse stands. From that point we are putting in a breakwater 1,000 feet long to shut out the prevailing storms from the western side of the harbor. That breakwater has a width of fifteen feet at the top, and it will rise ten feet above the mean level of the sea. It will contain altogether in the neighborhood of 3,000,000 cubic yards of rock, some of which is coming from the quarries of Porto Bello.

"At the Pacific end," continued Admiral Rousseau, "we are making an even greater breakwater. This is to join the port of Balboa with Naos Island, a distance of more than three miles. It will run nearly parallel with the axis of the canal prism, and is to keep the current which sweeps up that shore from affecting the canal. That breakwater will contain about 3,000,000 cubic yards of earth and rock, which is equal to a block 300 feet wide, 300 feet high and more than a mile in length. The most of this is already in place, and it consists of the spoil which has been brought down from the Culebra cut. We began work upon it in May, 1908.

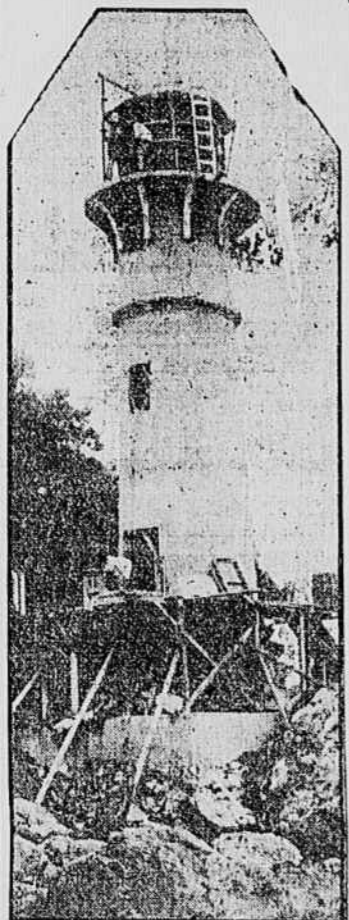
Big Docks on the Atlantic. "Tell me something more about your plans for the Atlantic end of the



Where the shops will be. The Pacific end of the canal.



Turning the Atlantic into the canal. This is at Mindi, on the way to Gatun.



1. One of the range lights on the Pacific end of the canal. The tower is built of concrete, and the acetylene light is worked by the sun.



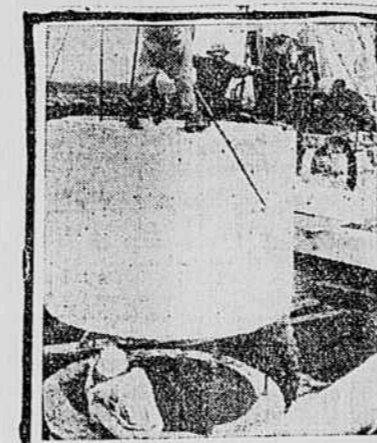
2. The Toro Point lighthouse, at Cristobal. This is the first light on approaching the canal.

"According to those we have already made," said Mr. Rousseau, "we shall, if Congress consents, build five great docks at Cristobal, each of which will be 1,000 feet long and 150 feet wide. There will be 300 feet between each two of the docks, and at the head of each dock will be ample landings for small boats. The material will be reinforced concrete, and the docks will have heavy tracks, moving cranes and all sorts of machinery for handling freight of every

description. They will accommodate any steamer now afloat, and should be sufficient for the traffic of the canal.

"But has Congress yet made any appropriation for the building of these docks?"

"No; but the demand for them is great, and we are fortunate in being able to construct the first of them through the resources of the Panama Railroad. That railroad is one of Uncle Sam's best paying enterprises. Through its commercial business it has already earned several million dollars above



Making the great docks at Balboa.

its net expenses, and this might be used for dock construction. As it is, the present facilities do not accommodate the traffic. This is so as to our link to the Panama Railroad—and it is so also as to the steamers of the United Fruit Company and of other lines which are now sending their vessels to Colon, but which would gladly change to the more sheltered and better anchored harbor we could provide. When our docks are completed our ships will land in United States territory, and the other vessels berthed there will be on the same territory."

"How about your warehouses and coaling arrangements?"

"We are now planning a type of warehouse to be built here, and are considering all sorts of dock structures and freight-handling appliances. The engineers think that these things should be settled at an early date, as possible, and the matter will soon come before Congress. One reason for this is that the government is using a vast amount of machinery in the building of the canal which can be applied to various things in connection with the terminals."

"We shall have to build dry docks and repair shops, and there is no reason why the government should not have establishments here which would repair any kind of shipping employed in the canal traffic. The machinery is already here, and it will have to be disposed of when the canal is completed. There will be shops at both ends of the waterway, although the repair shop at Balboa will probably be the larger. We have now an old dry dock there built by the French, which we have been using for our work on that side of the isthmus."

"What are your plans as to coaling facilities?"

"We will have to have docks and storage capacity for at least 200,000 tons of coal, and we shall also need storage at each terminal for something like 50,000 barrels of fuel oil. Many of the steamers of the Pacific are now burning oil, and we have to provide also space for any additional storage that may be required in the future. The one dock on the Atlantic will be such that many steamers can coal at one time. It will be at least 2,000 feet long. The chief depots for coal will be on the Atlantic end, the present plans providing for 200,000 tons of coal there, and about 50,000 tons on the Pacific side.

The Cities of the Canal. "Is it your idea, Mr. Rousseau, that great cities will grow up at the two ends of the canal?"

"No; and so far the commissioners have not thought it advisable to encourage that. The present opinion is that the population of the Canal Zone should be reduced to the minimum, and as far as we now see, we believe that there will be ample room in Cristobal for all the Americans at Panama. Colonel Goethals does not believe that the zone should be populated, for the reason that such a population might complicate matters in case the canal should need to be defended in time of war."

"As to cities at the terminal," continued Mr. Rousseau, "we have ample room both at Cristobal and at Balboa to build them if it seems now as though Colon and Panama could furnish all commercial facilities. If our present plans are adhered to we shall have canal headquarters on Sosa Hill, adjacent to Balboa. These will consist of an administration building and the necessary houses for employees. The administration offices will be large enough to accommodate the heads of the departments and clerks, and the houses will be for them and the employees engaged in the shops and in the various docks and wharves."

"But suppose Uncle Sam should want to establish a great free port at Panama, where goods from all parts of the world might be exchanged. Such facilities have had much to do with building up Hamburg and some others of the great seaports of Europe."

"I doubt whether that would be advisable, but if so, it is a question for the future."

The Docks at Balboa. "Can you not give me some idea of what we should have at the terminals on the Pacific?" I asked.

"We shall need about a mile of dock frontage outside the coaling docks, and we shall prepare a sufficient area that can be kept for the expan-



The water rushing through the mighty conduit will raise the steamer.

This snapshot was taken below the locks. Mr. Carpenter, who stands in the center, is five feet seven inches tall.

sion of the water frontage as required in the future. Our plans propose a coal dock 1,000 feet long and fuel stations on the hills so connected with this by pipes that the oil will flow right down into the steamers. We shall have repair shops and, connected with them, marine railroads of large size, so that examinations and repairs of tugs, barges and similar small vessels may be made without taking them into the large dry docks."

"And then as the dry dock," continued Mr. Rousseau, "it is proposed to build one at Balboa so big that it will handle any vessel that can pass through the locks. This dry dock will be near the end of the auxiliary coaling station, and it will be entered from the canal channel through a slip 400 feet long."

"What are the present arrangements for handling freight at Balboa?"

"They are not sufficient for the traffic. The only facilities consist of a steel wharf about a thousand feet long, which was built by the French, and a wooden extension much shorter. The latter was constructed since we began our work here. These two wharves can berth only five vessels at once, and at present the steamships making Balboa a port of call are often delayed. This condition is being remedied by the construction of a concrete wharf about 700 feet long, which will afford two additional berths. This is being made by the Panama Railroad with its own funds, but it has been so located that if Congress should authorize the construction we have outlined it will fit into it and become a part thereof. Our plans are such that additional wharves can be constructed from time to time as needed."

A Trip Through the Canal. I here asked Admiral Rousseau to give me some idea of what one would see in making a trip through the canal when completed. He replied:

"We shall start in from the Atlantic. Let us suppose that the traveler is standing on the deck of the steamer from New York or New Orleans as it approaches the coast. Nearing the

canal entrance he sees the low wooded buildings of Colon on the left, the houses of Cristobal among the coconut trees and the tall white lighthouse of Toro point away at the right. He passes by Colon and its harbor and, going in by the breakwater putting out from Cristobal Point, enters the canal. He steams on up through it to the foot of the Gatun locks, a distance of about seven miles. As he comes in he can see the old French canal, and he crosses it near Mindi, about half way to Gatun. The channel here is about 500 feet wide and the country is flat on the left, while on the right in the distance may be seen grassy hills.

"Coming to Gatun the man sees the great green grassy road dam at the right. It is now ragged and rocky, but it will be filled in with earth and matted, and it will end in green hills with the white concrete spillway showing out at the center."

"At his left as he moves up the channel he will see the mighty white locks of Gatun. The lowermost one will probably be open, and its water will be on the level of the sea. His ship will steam into it, and there he harnesses to the four towing locomotives which will aid in moving and steadying it as it goes onward from gate to gate."

As soon as the vessel is in the gates behind will be closed, and water rushing through many holes from the mighty conduit, so big that a Pullman train could go through them, will quickly raise the steamer to the level of the lock above. A moment later the front gates of the lock will open, and the steamer will pass into the second level or lock, and there in the same way rise to the third and finally sail out through the channel into Gatun Lake at eighty-five feet above the level from which it steamed into lock No. 1."

Traveling Through Gatun Lake.

At this point Admiral Rousseau stopped a moment to show me some maps, and then, tracing the course of the ship with his finger, he continued:

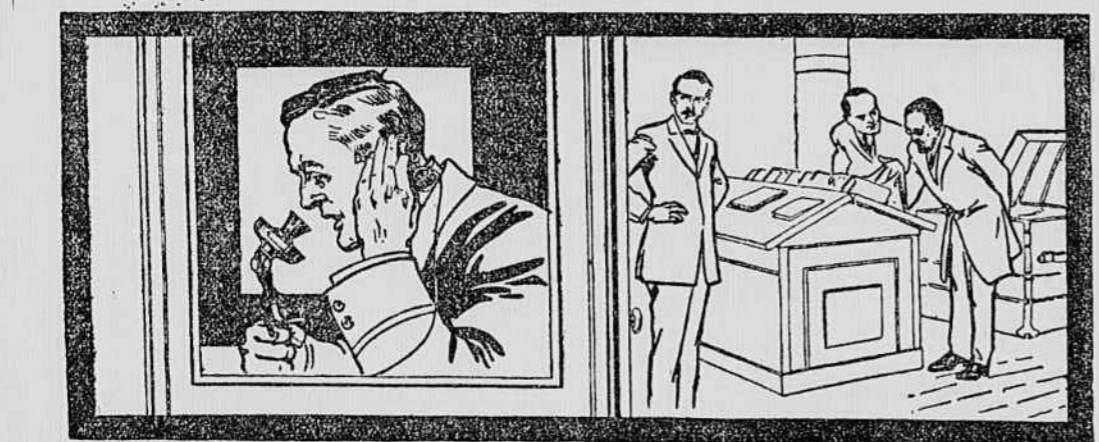
"Emerging from the locks at Gatun, the course of the steamer will be practically due south for three and one-half miles. It will pass through a thousand-foot channel, with the water extending beyond it, and the tops of the trees and islands will take away the idea of a canal and make one think that he is passing through a large and deep lake. A little farther on his vessel will take a sharp turn to the left and then a half mile to a point about one mile below where Bohio now is. From that point on the right the opening excavated by the French for their locks may be seen, and a little farther on the vessel will pass over the after of Pajoles and other villages which have been submerged by the waters of Gatun Lake."

"After a journey of fifteen miles the thousand-foot channel begins to narrow. It is reduced to 500 feet and the canal has now the appearance of a wide river with hills on each side. It is the valley of the Chagras. Still farther on the channel is reduced to 300 feet, and the vessel passes on into the Culebra Cut and sails through it for a distance of nine miles to the locks of Pedro Miguel. This part of the journey will be especially interesting. The canal channel will be 200 feet wide and the hills will rise high above the steamer, reaching in the center a maximum of over 550 feet. The sides will be planted with earth-binding grasses and bushes, and there will be but little evidence of the mighty work we have done in making the cut."

"Entering the locks at Pedro Miguel the steamer will drop thirty feet into Miraflores Lake, a beautiful sheet of silver water, and will travel there a mile and a half before it reaches the locks of the same name, where it will make its two great steps to the channel at the level of the Pacific."

"From the foot of the locks the ride to Balboa will be only three miles, and to deep water in the ocean five miles farther. The land there is low, with hills in the background covered with green. On the left going out will be the great wharves and repair shops of Balboa, and in the distance one may see the little archipelago of Perico, Culebra and Flamenco, on which the fortifications will be.

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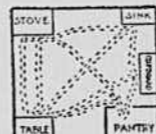


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